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STEEL PLANTS: ELECTRIC ARC FURNACES

Proposed Standards of Performance for New Stationary Sources

ENVIRONMENTAL PROTECTION AGENCY

[40 CFR Part 60]

[FRL 278-6]

STEEL PLANTS: ELECTRIC ARC FURNACES

Standards of Performance for New Stationary Sources

Pursuant to section 111 of the Clean Air Act, as amended, the Administrator proposes herein standards of performance for new electric arc furnaces in steel plants.

On December 23, 1971, the first standards of performance were promulgated. Those were for affected facilities at new fossil fuel-fired steam generators, incinerators, portland cement plants, nitric acid plants, and sulfuric acid plants. Since that time, additional standards have been promulgated for other categories of sources (March 8, 1974, 39 FR 9308) and several other publications in the FEDERAL REGISTER have amended the standards.

As prescribed by section 111, proposal of standards for electric arc furnaces was preceded by the Administrator's determination that they contribute significantly to air pollution which causes or contributes to the endangerment of public health or welfare and by his publication of this determination in this issue of the FEDERAL REGISTER.

Electric arc furnaces were selected for the development of standards based primarily on expected growth and the beneficial impact which would result from the application of best technology for air pollution control. Their growth has been spurred as old open hearth furnaces are phased out of production. Steel metallurgical furnaces were recommended for consideration for standards in the Report of the Committee on Public Works, United States Senate, September 17, 1970, and named as a major source of air pollution in 40 CFR Part 52, "Prevention of Significant Air Quality Deterioration," as proposed in the FEDERAL REGISTER, August 27, 1974 (39 FR 31000). In addition, electric arc furnaces were recognized as a major source of particulate pollutants in the steel industry during development of standards of performance for basic oxygen furnaces.

The proposed standards restrict the emission of particulate matter and the visibility of emissions. They are based on results of measurements of emissions conducted by industry, the Environmental Protection Agency and local agencies; data derived from available technical literature; information gathered during visits to pollution control agencies and plants in the United States; and comments and suggestions solicited from those knowledgeable in the field of air pollution control. The proposed standards reflect the degree of emission limitation achievable through the application of the best system of emission reduction which, taking into account the cost of achieving such reduction, the Administrator has determined to have been adequately demonstrated.

Detailed information on the factors considered in arriving at the proposed standards, including economic data and summaries of test data may be found in Background Information on Standards of Performance: Electric Arc Furnaces in the Steel Industry which is available free of charge from the Emission Standards and Engineering Division, Environmental Protection Agency, Research Triangle Park, North Carolina 27711, Attention: Mr. Don R. Goodwin. It is emphasized that the costs are considered reasonable for new sources. It is not implied that the same costs apply to the retrofitting of existing sources.

Of particular interest is the concept of average opacity used in this standard for emissions from the building during charging and tapping. Although regulations which restrict the maximum allowable opacity from air pollution sources have been enforced for many years, the concept of "average" opacity has not been used. Using traditional opacity regulations, an air pollution source with cyclical emissions would have a regulation based on the maximum opacity during the cycle. Such a regulation (e.g., maximum 80 percent opacity) would permit emissions of 80 percent during the entire cycle. In contrast, a regulation based on the average would permit an increase in off-peak emissions only if there is some corresponding reduction in the opacity during the period of peak emissions.

Even a short time exemption to allow for peak emissions up to a specified level would not significantly improve a regulation based on maximum opacity. The opacity of emissions during charging and tapping can climb as high as 80 percent, with the peak lasting a relatively short time. On the other hand, emissions may reach a lower peak, but remain there a longer period. A standard with a time exemption that allows for the high peaks in some cases and the longer periods in other cases would be far less restrictive, than one based on the average during charging and tapping. Average opacity, used for the sole limit on emissions from charging and tapping, better represents the quantity of emissions and should provide a more reproducible parameter with which to measure emissions.

The proper use of and test methods for opacity standards are presently being reconsidered by the Agency in response to remands from the United States Court of Appeals for the District of Columbia Circuit in Portland Cement Association v. Ruckelshaus, 486 F.2d 375 (1973), and Essex Chemical Corp. v. Ruckelshaus, 486 F.2d 427 (1973). The response to the remand in the Portland Cement case should be completed shortly. At that time, the Agency will promulgate or propose such revisions of its opacity standards or test methods as it deems necessary or desirable. In accordance with section 117(f) of the Act, publication of these proposed amendments to 40 CFR was preceded by consultation with appropriate advisory committees, independent experts and Federal departments and agencies. In the course of these consultations, the Department of Commerce has questioned the establishment of visible emissions (opacity) standards. The Department of Commerce believes that opacity limits have not been satisfactorily correlated to give rates of particulate concentration emissions or mass emissions to establish opacity as a standard. Further, Commerce has questioned whether such standards would be subject to accurate visual determination. Commerce, therefore, recommended that opacity limits not be adopted as a standard where a particulate concentration or mass emissions standard is established. Commerce believes such opacity limits should only be used in those cases to create a rebuttable presumption of a violation of the particulate or mass emissions standards. Commerce believes such presumption could, for example, be rebutted by providing a continuous opacity monitor record showing a visual opacity observation to be in error; and/or by a showing that the particulate concentration or mass emissions standards was not exceeded at the time the opacity limit was exceeded. Commerce believes such a showing could be made by a performance test. If the owner or operator wished to use such test to show that he was not in violation of the mass or concentration standard at the time the opacity limit was exceeded, he must be able to establish the critical plant and control operating parameters that existed at the time of the observed opacity violation by a system of continuous monitoring and recording of such data so that such conditions can be duplicated at the time of the test.

EPA does not support the approach suggested by the Department of Commerce and is proposing opacity standards in the regulation. EPA believes that the opacity concept is both technically sound and the most practical and inexpensive way to insure that control equipment is adequately maintained and operated between performance tests. A performance test conducted after a source was observed to be in violation of the opacity standard would not in EPA's opinion necessarily resolve the question whether, at the time of the observed violation, the source was meeting the concentration standard. During the period between the observed violation of the opacity standard and the time of the performance test, the owner or operator in some cases could take remedial action to bring a non-complying source into compliance. EPA's opinion is that the only way to resolve this problem would be through use of a continuous monitoring system or through performance tests conducted at such frequent intervals as to yield similar results. EPA believes the approach suggested by the Department of Commerce is not a realistic or practical alternative in the absence of an appropriate continuous monitoring system. However at the request of the Department of Com-

merce, EPA is submitting for public comment that agency's recommendation and will consider any comments of State officials, industrial representatives, environmentalists, and the general public on this or any other alternative approach.

Provisions in § 60.8(b) allow the owner/operator to show compliance with the standard of performance by use of an equivalent test method, alternative test methods or other means upon approval by the Administrator. These provisions permit construction of some types of control devices such as monitor and open or pressurized fabric filters, the emissions from which cannot be measured by reference methods currently in Appendix A of 40 CFR 60. The alternative to such a provision appeared to be ban of certain types of control devices. In the case of an open or pressurized fabric filter, factors such as a significantly lower installation cost and ease of identification and replacement of leaking bags make it superior to the closed top fabric filter system for this application. Such practical considerations argued in favor of avoiding the loss of an effective control system which would ensue from a prohibition of systems not amenable to representative sampling. The owner/operator of an affected facility should submit for review under § 60.6 the plans for construction and/or testing of control systems which are not readily amenable to representative testing.

The standard will require either of two types of air pollution control systems. The first is commonly referred to as "building evacuation." Those plants that manufacture many types of alloy steels discharge both the furnace emissions and all building ventilation air through a fabric filter. The second is a "combination system." Used by many furnaces that process carbon steel, it has two capture systems: the bulk of the emissions exhaust directly from the furnace to the control device (direct shell evacuation); the emissions during charging or tapping are captured by either a canopy hood or a building evacuation system, then directed to a control device. Most direct shell evacuation systems now in use discharge through either a fabric filter or a venturi scrubber, while the canopy hoods or building evacuation only discharge through fabric filters. Those plants that choose the direct shell evacuation—canopy hood system will probably depend on natural convection through the roof of the building to ventilate the shop.

The possible adverse environmental impact resulting from the proposed standards has been considered and determined negligible. The local impact on ambient air quality of a proposed new furnace should be closely investigated. Under extremely adverse meteorological and topographical conditions a plant which achieves the standard of performance may still cause the national ambient air quality standard for particulate matter to be exceeded. The standard of performance will most commonly be achieved by installation of fabric filters which create no water pollution problems. Any increase in the amount of solid waste collected by control devices installed to meet this standard will be infinitesimal compared to the large amounts of slag solid waste which the industry must already dispose. Care should be used in land disposal to ensure long-term protection of surface and subsurface waters.

The solid wastes contain potentially harmful constituents such as cadmium, chromium, or lead compounds. Consequently, landfill sites should be selected to prevent horizontal or vertical migration of these contaminants to surface or ground waters. Where geologic conditions may not reasonably ensure this, adequate precaution such as impervious liners should be taken to ensure long-term protection of the environment. The location of solid hazardous materials disposed of in this manner should be permanently recorded in the appropriate office of the legal jurisdiction in which the site is located.

A study showed that promulgation of the standard will not increase the national consumption of power over that required by State Implementation Plans.

An extensive investigation led to the judgment that the costs resulting from the proposed standard of performance are reasonable. In some states where particulate matter and visible emission standards require comparable investment in equipment to that required for the proposed standard, the economic impact is negligible. In other states, the incremental cost to attain the standard is not anticipated to create any undue economic hardship. Standards sometimes result in a more severe economic impact on smaller firms. This is primarily because economies of scale generally favor larger installations. For loan purposes, the Small Business Administration defines a small steel company as one with less than 1000 employees. There are 19 such companies in the electric arc furnace field. These companies represent about six percent of the electric arc furnace capacity.

The small business enterprise is likely to construct smaller sized furnaces. For such furnaces, control costs may be somewhat higher because of economies of scale, yet, the basic furnace installation incurs similar economies of scale. Therefore, the costs are judged reasonable and should not unduly bar entry to the market or expansion of facilities for small businesses.

In accordance with section 117(f) of the Act, publication of these proposed amendments to 40 CFR Part 60 was preceded by consultation with appropriate advisory committees, independent experts, and Federal departments and agencies. Interested persons may participate in this rulemaking by submitting written comments (in triplicate) to the Emission Standards and Engineering Division, Environmental Protection Agency, Research Triangle Park, North Carolina 27711, attention: Mr. Don R. Goodwin. The Administrator will welcome comments on all aspects of the proposed regulations, including economic and technological issues. All relevant comments received not later than 45 days from the date of this proposal will be considered. Comments received will be available for public inspection at the Office of Public Affairs, 401 M Street SW., Washington, D.C. 20460.

This notice of proposed rulemaking is issued under the authority of sections 111 and 114 of the Clean Air Act, as amended (42 U.S.C. 1857c–6 and 9).

JOHN QUARLES,
Acting Administrator.

OCTOBER 11, 1974.

It is proposed to amend Part 60 of Chapter I, Title 40 of the Code of Federal Regulations, by adding subpart AA as follows:

Subpart AA—Standards of Performance for Steel Plants: Electric Arc Furnaces

60.270 Applicability and designation of affected facility.
60.271 Definitions.
60.272 Standards for particulate matter.
60.273 Emission monitoring.
60.274 Test methods and procedures.

AUTHORITY: Secs. 111, 114, Pub. L. 91–604 (42 U.S.C. 1857c–6 and 9).

§ 60.270 Applicability and designation of affected facility.

The provisions of this subpart are applicable to the following affected facilities in steel plants: electric arc furnaces and dust-handling equipment.

§ 60.271 Definitions.

As used in this subpart, all terms not defined herein shall have the meaning given them in the Act and in subpart A of this part.

(a) "Electric arc furnace" (EAF) means any furnace that produces molten steel and heats the charge materials with electric arcs from carbon electrodes. Furnaces from which the molten steel is cast into the shape of finished products, such as in a foundry, are not affected facilities included within the scope of this definition.

(b) "Dust-handling equipment" means any equipment used to handle particulate matter collected by the control device and located at or near the control device for an EAF subject to § 60.272.

(c) "Control device" means equipment used to remove particulate matter generated by an EAF(s) from a gas stream.

(d) "Control system" means the control device and any equipment (to include ducts, hoods, etc.) used to capture or transport particulate matter generated by an EAF to the control device.

(e) "Charging" means the addition of iron and steel scrap or other materials into the top of an electric arc furnace. The charging period begins when the furnace roof starts to open and ends when the roof is returned to its closed position.

(f) "Tapping" means the pouring of molten steel from an EAF. The tapping period begins when the furnace tilts to

pour and ends when the furnace returns to an upright position.

(g) "Average opacity" means the arithmetic average of opacity readings in accordance with Method 9 in Appendix A of this part.

(h) "Heat" means the period commencing when scrap is charged to an EAF and terminating at the time the furnace tap is completed.

(i) "Shop" means the building which houses one or more EAF(s).

§ 60.272 Standards for particulate matter.

(a) On and after the date on which the performance test required to be conducted by § 60.8 is completed, no owner or operator subject to the provisions of this subpart shall cause to be discharged into the atmosphere from an electric arc furnace any gases which:

(1) Exit from a control device and contain particulate matter in excess of 12 mg/dscm (0.0052 gr/dscf).

(2) Exit from a control device and exhibit 5 percent opacity or greater.

(3) Exit from the shop and exhibit greater than zero percent opacity more than 1 minute per furnace in any 1 hour except when paragraphs (a)(4) and (a)(5) of this section apply.

(4) Exit from the shop and exhibit 20 percent average opacity or greater during and as a direct result of charging a furnace and for 3 minutes thereafter.

(5) Exit from the shop and exhibit 40 percent average opacity or greater during and as a direct result of tapping a furnace and for 3 minutes thereafter.

(b) On and after the date on which the performance test required to be conducted by § 60.8 is completed, no owner or operator subject to the provisions of this subpart shall cause to be discharged into the atmosphere from dust-handling equipment any gases which exhibit 10 percent opacity or greater.

(c) If the control system is operated such that the roof of the shop is closed during a charge and/or tap and visible emissions are prevented until the roof is opened after the charge and/or tap, the average opacity standards specified in paragraphs (a)(4) and (a)(5) of this section apply, except that the period when these opacity standards apply shall start when the roof is opened and shall continue for the same length of time as paragraphs (a)(4) and (a)(5) of this section would have allowed.

§ 60.273 Emission monitoring.

(a) A continuous monitoring system for the measurement of the opacity of emissions discharged into the atmosphere from the control device(s) shall be installed, calibrated, maintained, and operated by the owner or operator.

(b) For the purpose of reports required under § 60.7(c), periods of excess emissions that shall be reported are defined as all 1-minute periods during which the average opacity is 10 percent or greater.

§ 60.274 Test methods and procedures.

(a) Reference methods in Appendix A of this part, except as provided for in § 60.8(b), shall be used to determine compliance with the standards prescribed in § 60.272 as follows:

(1) Method 5 for concentration of particulate matter and associated moisture content,

(2) Method 1 for sample and velocity traverses,

(3) Method 2 for velocity and volumetric flow rate,

(4) Method 3 for gas analysis, and

(5) Method 9 for opacity.

(b) For Method 5, the sampling time for each run shall be at least 4 hours. When a single EAF is sampled, the sampling time for each run shall also include an integral number of heats. Shorter sampling times, when necessitated by process variables or other factors, may be approved by the Administrator. The minimum sample volume shall be 4.5 dscm (160 dscf). When more than one air pollution control device serves the affected facilities being tested, the concentration of particulate matter shall be determined using the following equation:

$$C_s = \frac{\sum_{n=1}^{N} (C_s Q_s)_n}{\sum_{n=1}^{N} (Q_s)_n}$$

where:

C_s = concentration of particulate matter in mg/dscm as determined by Method 5.

N = total number of air pollution control devices tested.

Q_s = volumetric flow rate of the effluent gas stream in dscm/hr as determined by Method 2.

$(C_s Q_s)_n$ or $(Q_s)_n$ = value of the applicable parameter for each air pollution control device tested.

(c) The air pollution control system for the affected facility must be designed so that particulate matter emissions can be accurately determined. The air pollution control system for the affected facility shall be constructed so that particulate matter emissions can be accurately determined by applicable test methods and procedures.

(d) When emissions from affected facilities cannot be maintained separate from emissions from sources other than affected facilities or existing furnaces, the owner or operator shall choose from the following criteria for a performance test:

(1) Base compliance on control of the combined emissions.

(2) Shut down emission sources other than the affected facilities.

(3) Determine a method acceptable to the Administrator to compensate for the effect on results of the performance test of the other emission sources.

(4) Any combination of (1), (2), and (3) above.

(e) When a single air pollution control system serves more than one affected facility, compliance shall be based on a single performance test of all such affected facilities.

(f) For any affected facility which is installed within an existing shop and for which measurements representative of particulate matter emitted from only the affected facility cannot, in the Administrator's judgment, be reasonably obtained the owner or operator may: (1) Base compliance on control of the combined emissions from the shop, or (2) in lieu of a performance test, show to the Administrator's satisfaction that the air pollution control system is equivalent or superior in the control of air pollution to that which would be required within a new shop. Proof of equivalency shall include a comparison of:

(1) Exhaust flow rates.

(2) Size, shape, depth, and location of hoods or other emission capture devices.

(3) Design, operating, and maintenance parameters of the control system.

(4) Other parameters the Administrator may request.

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